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A Study of the Fish Farms in Southern Delta State, Nigeria

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Summary

A survey of the fish farms in the southern part of Delta State, Nigeria was carried out to determine the significant changes that have taken place since a similar study was carried out 5 years earlier. The results show that fish farming has attained a greater commercial status. Between 1989 and 1994, the projected total area under cultivation rose by 86.8 % to 564.4 ha while average production increased significantly to 2,315.16 kg/ha/yr from 913.07 kg/ha/yr. This increased yield is attributed to better management of the farms. However, many problems are still slowing down the growth and development of aquaculture in the area mainly because many of the measures initiated by government over the years have been largely unsuccessful.

Résumé

Une étude des élevages de poisson dans la région sud du "Delta State" Nigéria, fut menée pour évaluer les changements significatifs qui sont apparus depuis une étude semblable réalisée 5 ans plus tôt. Les résultats montrent que l'élevage de poisson a atteint un niveau commercial supérieur. Entre 1989 et 1994, la surface totale en exploitation s'est élevée de près de 86,8% à 564,4 ha tandis que la production augmentait significativement jusqu'à 2.315,16 kg/ha/an au départ de 913,07 kg/ha/an. Cet accroissement de rendement est attribué à une meilleure gestion des élevages. Cependant beaucoup de problèmes freinent encore la croissance et le développement de l'aquaculture dans la région, principalement à cause de nombreuses mesures instaurées par le gouvernement au cours des années qui ont été grandement infructueuses.

1. Introduction

It has long been recognised by fish scientists working in Nigeria (3, 7, 10) that fish farming remains about the most viable option to increase local fish production to a level where it can match demand. This has necessitated research directed to identifying factors slowing down the growth and development of this enterprise.

A study (6) carried out in 1989 evaluated the status, prospects and problems of aquaculture in the «delta area» of the then Bendel State (now Delta and Edo States) in Nigeria. That study identified the area as possessing a great potential for aquaculture with good fish yields averaging 913.07 kg/ha. However, high costs of pond construction, of acquisition of land and of feeds as well as lack of finance were identified as some of the major constraints facing fish farming in the area.

The present report is the result of a re-evaluation of the fish farms in this same area, (now identified as Southern Delta State, Nigeria) after five years and to determine the effectiveness of different remedial measures pursued by some governmental and non-governmental bodies.

2. Study Area, Material and Methods**2.1. Study Area**

This study was carried out in 14 Local Government Areas located in the southern part of Delta State, Nigeria. The state lies between longitude 5°00' and 6°45' East and latitude 5°00' and 6°30' North.

The area is essentially riverine, particularly in the southern extremes where there are many rivers, creeks, marshy terrain and mangrove swamps. A large proportion of the area is rural, lacking basic infrastructural facilities (4).

2.2. Material and Methods

The study was carried out between March and July, 1994 using a structured questionnaire designed to collect information on ownership, types and sizes of culture units, water sources, species cultured, management techniques, yield, marketing strategies, profits/losses, extension services and major problems.

A total of 68 fish farms were identified in the area. Of this number, 42 were randomly chosen for the study. These were physically visited and inspected.

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3. Results and Discussion

3.1. Basic characteristics of the culture units

The relative changes between 1989 and 1994 in the basic characteristics of the fish farms surveyed is presented in Table 1. The results show that fish farming has assumed a greater commercial status in the area as reflected in the ownership structure where there has been an increase in the proportion owned by large corporate bodies.

TABLE 1
The characteristics of the fish farms

Characteristic	% of ponds		
	1989	1994	Difference
Ownership			
Individual/Small Company/Community	94.3	90.5	-3.8
Large company	5.7	9.5	3.8
Farm status			
Subsistence	5.7	2.4	-3.3
Commercial	91.4	95.2	3.8
Experimental/demonstration	2.9	2.4	-0.5
Water type			
Fresh	82.9	76.2	-6.7
Brackish	17.1	23.8	6.7
Water source			
Well/borehole	71.4	66.7	-4.7
River/tidal inflow	28.6	33.3	4.7
Pond type			
Earthen	95.2	90.7	-4.5
Cemented	4.8	9.3	4.5
Pond use			
Brood	11.8	9.7	-2.1
Nursery	26.2	27.1	0.9
Growing	62.0	63.2	1.2
Farming operation			
Complete	40.0	61.9	21.9
Incomplete	60.0	38.1	-21.9
Culture type			
Monoculture	17.0	19.3	2.3
Polyculture	83.0	80.7	-2.3
Monosex culture	0.0	0.0	0.0

The increase in the proportion of brackish water fish farms is an indication of increased coastal aquaculture. In the earlier study (6), it was found that the major factor impeding the growth of coastal aquaculture was that the technology of pond construction and management in coastal areas was not readily available.

Between 1985 and 1994, the proportion of farms that carry out complete fish farming operations from hatchery through table-size fish production increased by 21.9 %. The trend is for farms to become self-sufficient in fingerling supply by operating hatcheries. Although there was a slight increase in the proportion of monoculture ponds, monosex culture, a method of checking reproduction was still completely absent.

3.2. Production

The number of fish farms in the area increased marginally by 19.3 % in 5 years. The total area under cultivation in the 42 farms sampled in 1994 was 346.8 ha compared to 185.8 ha recorded for the 35 farms in 1989. With an average area of 5.3 ha/farm in 1989 and 8.3 ha/farm in 1994

the projected total area under cultivation increased from 302.1 ha in 1989 to 564.4 ha in 1994, representing a 86.8% increase. Although this increase is significant, the area under cultivation is still low compared to the size of land that is suitable for aquaculture.

The common species under cultivation remain *Tilapia* species especially *Oreochromis niloticus*, *O. galilaeus*, *Tilapia guineensis*, and *T. zilli*, *Heterotis niloticus*, *Channa obscura* and the catfishes, *Clarias gariepinus*, *Heterobranchus* spp and *Clarias/Heterobranchus* hybrid with the hybrid becoming much more common now than in 1989.

The average stocking density increased to 22,318 fish/ha from 19,325 fish/ha in 1989. Although this mean value is adequate, the stocking rates in some ponds were low.

Mean fish yield for the farms was 2,325.16 kg/ha/yr, up from 913.07 kg/ha/yr reported in 1989. This marked increase is likely a result of better management of the farms and the integration of poultry in some ponds. Previously reported annual production figures for fish farms in Nigeria include 351-1,083 kg/ha for carp farms (1) and 957-1,159 kg/ha for a polyculture in a coastal pond in the Lagos area (8). Higher fish yields of up to 3,460 kg/ha/yr have been reported for integrated agro-aquaculture systems in Panama (5). It follows that with the better management of such integrated farms, higher production rates may be achieved in this area. Similar developments have also been reported in Asian countries like China (10) and the Philippines (2).

3.3 Management

As in 1989, over 90 % of the farms carried out at least one of the major routine management practices. However, the regularity and thoroughness of such practices varied widely among the different farms. The result of the assessment of the management practices in the different farms is summarized in Fig. 1. The results show a general improvement in the proportion of farms carrying out the routine management practices (except checking growth rate) in 1994 compared to 1989. It is also clear from both studies that many farms have paid little attention to proper water quality check.

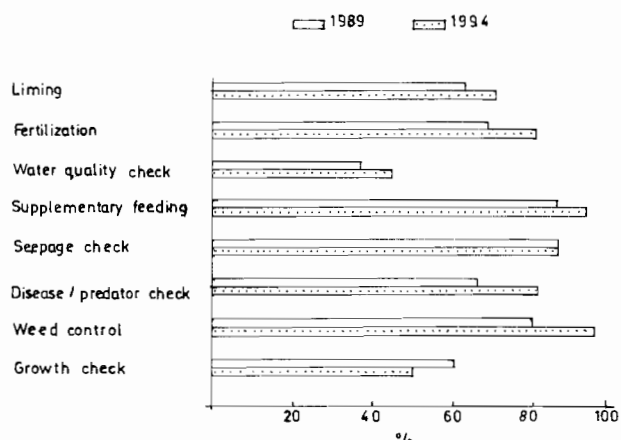


Fig. 1: Relative frequency of farms carrying out routine management procedures.

Although there was no marked change in the proportion of farms carrying out fertilization, there was a sharp drop in the use of inorganic fertilizers in relation to organic forms because of the relative cheapness and availability of the later. The single most common fertilizer in use was chicken manure.

Liming was also commonly practised but usually soon after pond construction. Only few farms used this as a means of controlling pH and phytoplankton growth in ponds.

Supplementary feeding remained the most commonly practised management technique as a means of boosting biomass production. The commonly used feeds and the relative rates of usage is presented in Fig. 2. Brewers' waste and poultry droppings are still the most important feeds. It would appear from the results that cost and availability, rather than nutritional adequacy were the major factors determining the utilization of the major feed types. The feeding rates varied among the farms studies.

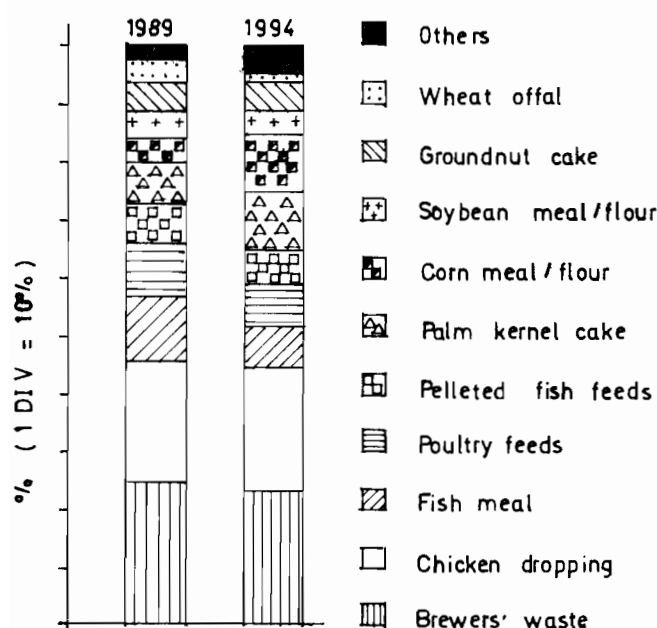


Fig. 2: Relative rate of usage of the different supplementary feeds.

3.4. Problems

The major problems of the farm, in a decreasing order of importance include:

a) Pond construction

The high cost of pond construction and the inadequacies of most of the fish ponds remain the most important problem facing aquaculture in this area. Many of the ponds are either wrongly sited, too deep, too shallow or lack basic drainage facilities. These adversely affect production. Without drainage facilities, the management of these ponds is always problematic. A number of fish ponds, especially in the tidal mangrove swamps suffer serious seepage problems because of poor construction.

b) Finance and operating cost

The inadequate provision of credit facilities by financial institutions remains a serious constraint. Many farmers need these loans to establish or expand their farms but banks and other financial institutions continue to give priority in this sub-sector to capture fisheries rather than aquaculture. Although the financial guidelines issued by government over the years to banks always lists rural farms as a priority sector in the receipt of loans, such categorisation has not been reflected in the actual disbursement of available funds.

The need for the provision of credit becomes more glaring when the cost of establishing and running a fish farm is examined closely. Within the last 5 years, the cost of constructing a hectare of fish pond in the area has risen by over 400 % from about N35,000.00 to over 2,000.00 (1N = 0.0455 US \$).

The cost of some essential inputs, summarised in Table 2 also follow a similar trend, thereby significantly raising the operating costs of the farms.

TABLE 2
Average prices (in Naira*) of some inputs in the running of fish farms in Delta State, Nigeria

Input	1989	1994	% increase
Inorganic fertilizer (100 kg)	80.00	500.00	525.0
Lime (100 kg)	200.00	900.00	350.0
Feeds			
Brewers' waste (100 kg)	50.00	300.00	500.0
Chicken dropping (100 kg)	10.00	70.00	600.0
Fish meal (100 kg)	160.00	1,120.00	600.0
Poultry feed (100 kg)	70.00	400.00	471.4
Pelleted fish feed (100 kg)	380.00	1,840.00	384.2
Harvesting net	3,500.00	12,200.00	248.6
«Chicoco» soil digger	70.00	400.00	471.4

*1 Naira = 0.0455 US Dollar

c) Feeds and feeding

The high cost of feeds (see Table 2) has led many farms to seek cheaper substitutes as discussed in 3.3. It is also the main reason for the irregular feeding pattern observed in some farms.

d) Fish seed for stocking

This problem of availability of fish seed has reduced considerably between 1989 and 1994 essentially because more farms are now carrying out hatchery operations and are thus becoming self-sufficient in fingerling production. The high cost and quality of these fish seed still remain serious problems. Some farms still obtain seed from the wild or from genetically-inadequate brood stock, thus culturing fish that exhibit poor feed utilization and growth and overall low productivity. On the whole, the Nigerian government's fish seed multiplication programme has not been very successful.

e) Lack of assistance to farmers

Assistance to fish farmers is supposed to come mainly in the form of extension services. Despite repeated pronouncements by government agencies and officials to

the contrary, effective extension services to fish farmers in the area is still lacking.

f) Water quality

The problem of water quality is mainly the result of oil spills from the operation of oil companies in the area. This kills many fish and render the ponds unsuitable for fish farming for a long time. The incidencies of such disasters have declined over the years.

g) Fish poaching

An increasing number of farms are having their fish stolen by thieves. This new trend may be as a result of the deteriorating economic conditions of the rural populace. Poaching brings about losses in farms and is capable of discouraging many farmers. The government-financed

Nigerian Agricultural Insurance Company (NAIC) was set up to help farmers overcome problems of this nature as well as mass kills of fish from diseases and disasters like oil spillages. However, most farms have not felt the impact of this company.

4. Conclusion

It is clear that many of the well-intended government measures have been largely unsuccessful. These include the provision of credit by financial institutions, the provision of extension services, the fish seed multiplication scheme and the provision of insurance cover to farms. Many of the problems facing the farms can be ameliorated if these measures are made to have their desired effects and subsidized inputs made available to the farmers.

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